

ABSTRACT OF THE DISCLOSURE

A method and system for measuring remotely the surface temperature of a silicon wafer and layers, without the need to know the surface emissivity. The surface temperature is measured *in-situ* and in real-time during a high-temperature process, in a vacuum system, by using the linear polarization property of radiation. A blackbody source is heated to various, known temperatures, and provides radiation that impinges on the silicon surface and is reflected from it together with a self-emitted component. This combined reflected radiation is polarized and filtered to an appropriate wavelength, and observed with an imaging camera. Pairs of orthogonally polarized images of the surface are obtained for a set silicon surface temperature and for each blackbody temperature. The pairs of images are analyzed, pixel by pixel, to obtain a null polar level indicative of the surface temperature. The system is provided with means for rapid variation of the blackbody temperature, thus allowing measurement of rapidly changing silicon surface temperatures.